

What is claimed is:

1. A system for storing data comprising:
 - a plurality of storage systems each of which comprises a controller and a disk; and
 - a virtualization apparatus coupled to said plurality of storage systems;
- wherein said virtualization apparatus comprises:
 - an input port to be coupled to a computer;
 - an output port to be coupled to said storage systems;
 - a transfer unit which transfers data between an input port and an output port;
 - a control unit; and
 - an access conversion table which records a matching relationship between a virtual volume which is a target of an access request from a computer and storage areas of said plurality of storage systems that are allocated to said virtual volume;
- wherein said control unit, upon receiving a write request issued by the computer to said virtual volume, allocate a storage area of said plurality of storage systems to said virtual volume and updates said access conversion table according to said write request, and
- converts said write request received from the

computer based on said updated access conversion table to a write request to a storage system having a storage area newly allocated to said virtual volume; and

wherein said transfer unit controls the storage system having a storage area newly allocated to said virtual volume to transmit the updated write request.

2. A system for storing data comprising:

a virtualization apparatus coupled to a computer;
and

a plurality of storage devices coupled to said virtualization apparatus;

wherein said virtualization apparatus

issues, based on the request from said computer, a notice to the effect that a predetermined size of a virtual volume has been allocated to said computer,

upon receiving an access request issued by said computer to said virtual volume, allocates storage areas existing in said plurality of storage devices,

converts the access request received from said computer to an access request addressed to a storage device having the storage areas allocated to said virtual volume,
and

transmits the access request to said storage device.

3. A system of claim 2, wherein

said notice to the effect that a predetermined size

of a virtual volume has been allocated contains a virtual volume identifier and a size of said virtual volume,

upon receiving the access request having said virtual volume identifier from said computer, said virtualization apparatus allocates storage areas existing in said plurality of storage device to a virtual volume that is identified by said virtual volume identifier,

converts the access request received from said computer to an access request addressed to a storage device having the storage areas allocated to said virtual volume, and

transmits the access request to said storage device.

4. A system of claim 3, wherein

said virtualization apparatus has an access conversion table which shows matching relationships between a virtual volume and the storage areas in said plurality of storage devices that are allocated to said virtual volume, and

when the storage areas existing in said plurality of storage devices are allocated to said virtual volume, updates said access conversion table.

5. A system of claim 4, wherein

said virtualization apparatus converts, by referring to the updated access conversion table, the access request received from said computer, and transmits the converted

access request to the storage device.

6. A system of claim 4, wherein

said virtualization apparatus updates said access conversion table, and releases allocation of storage areas, among storage areas allocated to the virtual volume, that are no more used by said computer.

7. A system of claim 3, wherein

said virtualization apparatus, at the time of writing management data based on initialization of a file system, allocates a storage area having a smaller capacity than the storage area available at the time of receiving an access request from said computer to said virtual volume, and writes the management data in the storage area thus allocated.

8. A system of claim 7, wherein

said virtualization apparatus uses log information of the system file to identify storage areas that are no longer used by said computer, among the storage areas that are allocated to the virtual volume.

9. A system of claim 3, wherein

said virtualization apparatus further has a free space management table in which a capacity of empty storage areas existing in said plurality of storage devices that is ready for allocation to a virtual volume is recorded, and outputs information that is recorded in said free space

management table to said computer.

10. A system of claim 9, wherein

said virtualization apparatus updates said free space management table when storage areas existing in said plurality of storage devices are allocated to the virtual volume.

11. A virtualization apparatus coupled to a plurality of storage devices and a computer using data stored in said plurality of storage devices, comprising:

a first port coupled to a computer;

a second port coupled to a storage device;

a transfer unit executing data transfer between said first port and said second port; and

a processor unit;

wherein

said first port receives a write request from a computer to a virtual volume,

said control unit, based on the write request thus received, allocates storage areas existing in said plurality of storage devices to said virtual volume, and converts the received write request to a write request addressed to a storage device having the storage areas allocated to said virtual volume, and

said transfer unit controllably transmits the converted write request to said storage device via the

second port coupled to the storage device having storage areas allocated to said virtual volume.

12. A virtualization apparatus of claim 11, wherein said virtualization apparatus notifies said computer, according to a request from said computer, of virtual volume identification information to identify said virtual volume and a size of said virtual volume, and

the write request to be received from said computer contains said virtual volume identifying information.

13. A virtualization apparatus of claim 12, further comprising:

an access conversion table which shows matching relationships between a virtual volume and storage areas in said plurality of storage devices that are allocated to the virtual volume concerned;

wherein said control unit updates said access conversion table when said control unit allocates storage areas existing in said plurality of storage devices to said virtual volume.

14. A virtualization apparatus of claim 13, wherein said control unit, by referring to said updated access conversion table, converts the write request received from said computer.

15. A virtualization apparatus of claim 13, wherein said control unit, by updating said access

conversion table, releases allocation of a storage area, among those storage areas that are allocated to the virtual volume, that is no longer used by said computer.

16. A virtualization apparatus of claim 12, wherein said control unit, when writing management data based on initialization of a file system, allocates a storage area having a smaller capacity than the storage area available at the time of receiving a write request from said computer to said virtual volume, and writes the management data in the storage area thus allocated.

17. A virtualization apparatus of claim 15, wherein said control unit uses log information of the file system to identify a storage area, among those storage areas that are allocated to the virtual volume, that is no longer used by said computer.

18. A virtualization apparatus of claim 12, further comprising:

a free space management table in which a capacity of empty storage areas existing in said plurality of storage devices which is ready for allocation to a virtual volume is recorded;

wherein information recorded in said free space management table is output according to a request from said computer.

19. A virtualization apparatus of claim 18, wherein

said control unit updates said free space management table when said control unit allocates storage areas existing in said plurality of storage devices to a virtual volume.